

DO-35



SOT-23

Pin 1 and 3 must be shorted together

## Features

- $V_{BO}$  : 32 V and 40 V
- Low breakover current
- Breakover voltage symmetry : 3V
- ECOPACK<sup>®</sup>2 compliant

## Applications

- Triggering device for Triac or SCR based motor / light dimmer
- 32 V trigger device for oscillator circuit
- Start up triggering in lighting ballast for CFL, TL or LED lamps

## Description

Functioning as a trigger diode with a fixed voltage reference, the DB3/DB4 series can be used in conjunction with triacs for simplified gate control circuits or as a starting element in fluorescent lamp ballasts.

The surface mount SOT23-3L package allows compact, SMD based designs for automated manufacturing.

### Product status link

[DB3](#)

[DB4](#)

[SMDB3](#)

### Product summary

| Part number | $V_{BO}$  |
|-------------|-----------|
| SMDB3       | 28 - 36 V |
| DB3         | 28 - 36 V |
| DB4         | 35 - 45 V |

# 1 Characteristics

**Table 1. Absolute maximum ratings (limiting values),  $T_j = 25\text{ °C}$  unless otherwise specified**

| Symbol    | Parameter  | Value       | Unit |   |
|-----------|--|-------------|------|---|
| $I_{TRM}$ | Repetitive peak on-state current, $t_p = 20\ \mu\text{s}$ , $F = 120\ \text{Hz}$ | SMDB3       | 1.00 | A |
|           |  | DB3 / DB4   | 2.00 | A |
| $T_{stg}$ | Storage junction temperature range   | -40 to +125 | °C   |   |
| $T_j$     | Operating junction temperature range   | -40 to +125 | °C   |   |

**Table 2. Electrical characteristics ( $T_j = 25\text{ °C}$  unless otherwise specified)**

| Symbol                | Parameter                                | Test conditions                                  | SMDB3 | DB3 | DB4  | Unit |               |
|-----------------------|--|--|-------|-----|------|------|---------------|
| $V_{BO}$              | Breakover voltage <sup>(1)</sup>         | $C = 10\ \text{nF}$ <sup>(2)</sup>               | Min.  | 28  | 28   | 35   | V             |
|                       |  |  | Typ.  | 32  | 32   | 40   |               |
|                       |  |  | Max.  | 36  | 36   | 45   |               |
| $ V_{BO1} - V_{BO2} $ | Breakover voltage symmetry               | $C = 10\ \text{nF}$ <sup>(2)</sup>               | Max.  | 3   | 3    | 3    | V             |
| $\Delta V$            | Dynamic breakover voltage <sup>(1)</sup> | $V_{BO}$ and $V_F$ at 10 mA                      | Min.  | 10  | 5    | 5    | V             |
| $V_O$                 | Output voltage <sup>(1)</sup>            | See Figure 2. Test circuit, ( $R = 20\ \Omega$ ) | Min.  | 10  | 5    | 5    | V             |
| $I_{BO}$              | Breakover current <sup>(1)</sup>         | $C = 10\ \text{nF}$ <sup>(2)</sup>               | Max.  | 10  | 50   | 50   | $\mu\text{A}$ |
| $t_r$                 | Rise time <sup>(1)</sup>                 | See Figure 3. Rise time measurement              | Max.  | 0.5 | 2    | 2    | $\mu\text{s}$ |
| $I_R$                 | Leakage current <sup>(1)</sup>           | $V_R = 0.5 \times V_{BO}\ \text{max}$            | Max.  | 1   | 10   | 10   | $\mu\text{A}$ |
| $I_P$                 | Peak current <sup>(1)</sup>              | See Figure 2. Test circuit                       | Min.  | 1   | 0.30 | 0.30 | A             |

1. Applicable to both forward and reverse directions.

2. Connected in parallel to the device

Figure 1. Voltage - current characteristic curve.



Figure 2. Test circuit

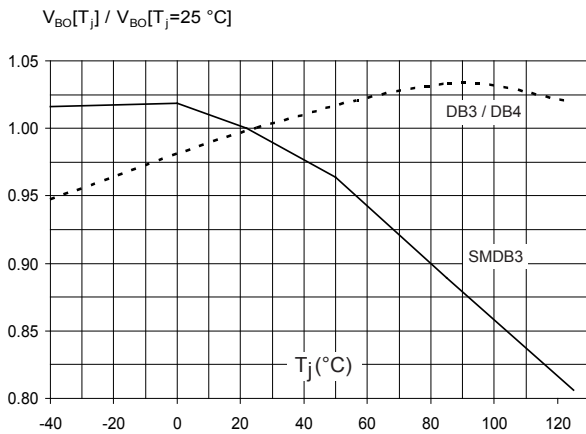


Figure 3. Rise time measurement

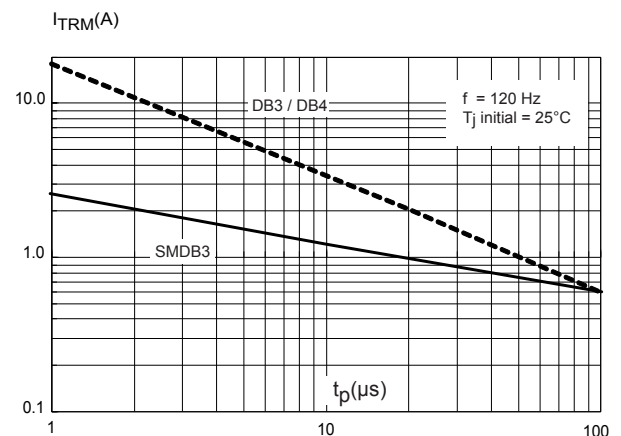


## 1.1 Characteristics curves

**Figure 4. Relative variation of VBO versus junction temperature (typical values)**



**Figure 5. On-state RMS current versus Triac gate current pulse duration  $t_p$**



**Figure 6. Triac gate current pulse duration  $t_p$  (to have  $I_p > 50$  mA) versus  $R_s$  and  $C$  values (typical values)**



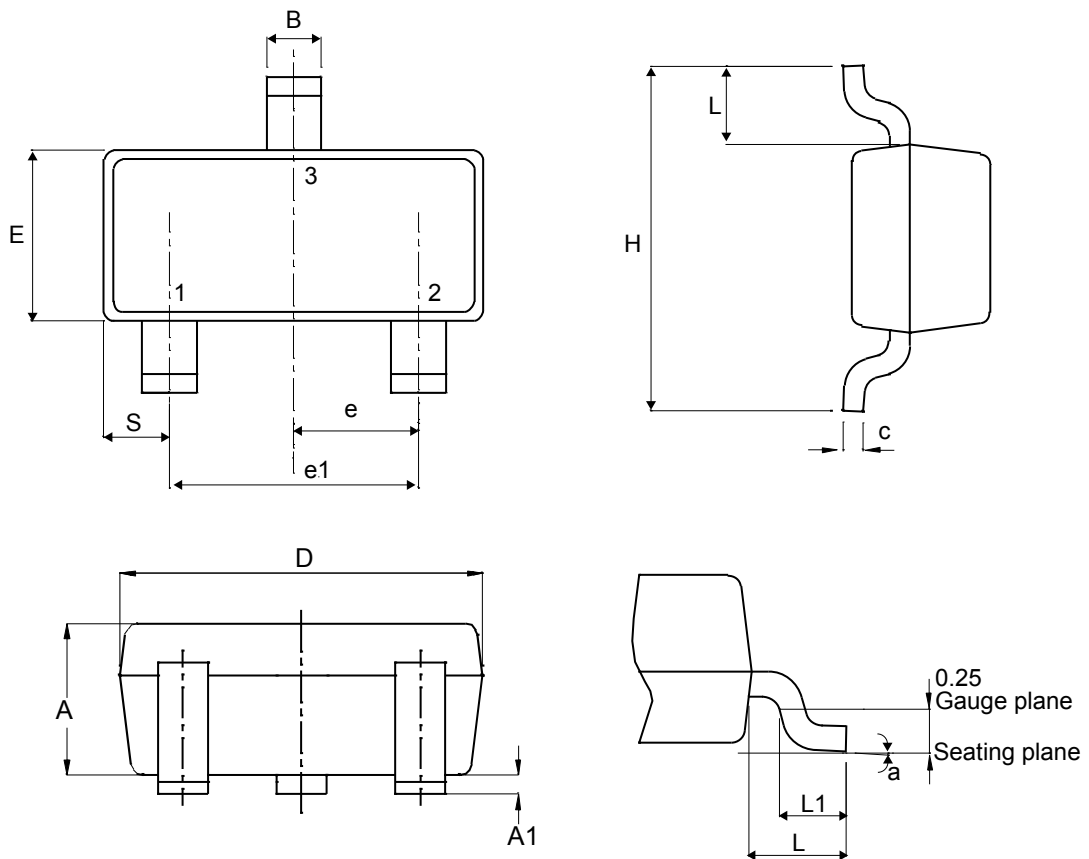
Note: according to Figure 2. Test circuit

## 2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of **ECOPACK®** packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK® is an ST trademark.

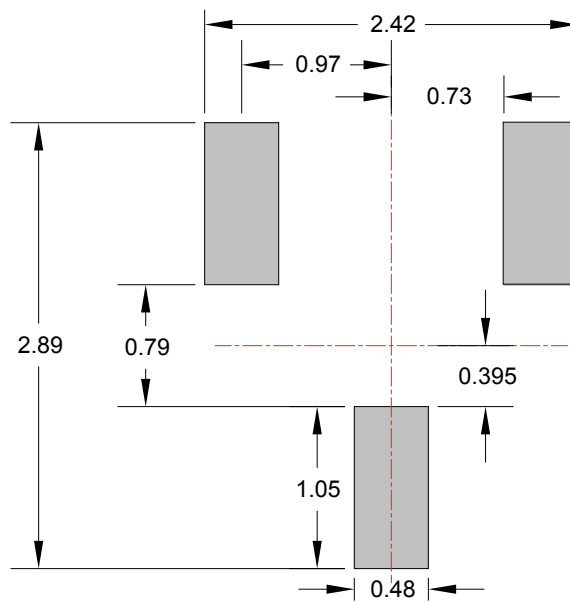
### 2.1 SOT23 package information

Figure 7. SOT23-3L package outline



**Table 3. SOT23-3L package mechanical data**

| Ref. | Dimensions  |      |      |                             |        |        |
|------|-------------|------|------|-----------------------------|--------|--------|
|      | Millimeters |      |      | Inches (for reference only) |        |        |
|      | Min.        | Typ. | Max. | Min.                        | Typ.   | Max.   |
| A    | 0.89        |      | 1.40 | 0.0350                      |        | 0.0551 |
| A1   | 0.00        |      | 0.10 | 0.0000                      |        | 0.0039 |
| B    | 0.30        |      | 0.51 | 0.0118                      |        | 0.0201 |
| C    | 0.085       |      | 0.18 | 0.0033                      |        | 0.0071 |
| D    | 2.75        |      | 3.04 | 0.1083                      |        | 0.1197 |
| e    | 0.85        |      | 1.05 | 0.0335                      |        | 0.0413 |
| e1   | 1.70        |      | 2.10 | 0.0669                      |        | 0.0827 |
| E    | 1.20        |      | 1.75 | 0.0472                      |        | 0.0689 |
| H    | 2.10        |      | 3.00 | 0.0827                      |        | 0.1181 |
| L    |             | 0.60 |      |                             | 0.0236 |        |
| S    | 0.35        |      | 0.65 | 0.0138                      |        | 0.256  |
| L1   | 0.25        |      | 0.55 | 0.0098                      |        | 0.0217 |
| a    | 0°          |      | 8°   | 0°                          |        | 8°     |

**Figure 8. SOT23-3L footprint in mm**


## 2.2 DO-35 package information

Figure 9. DO-35 package outline

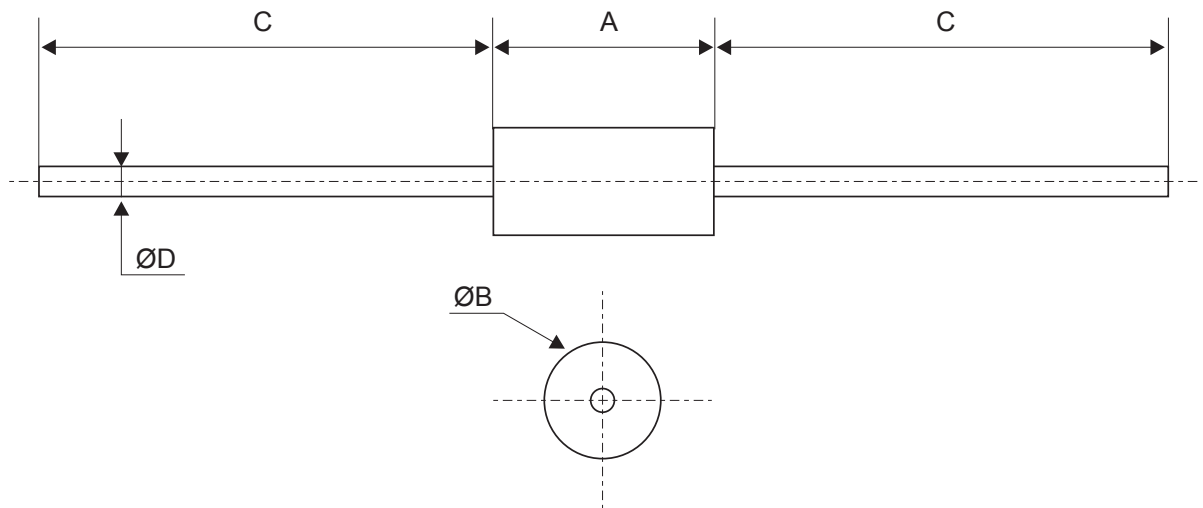
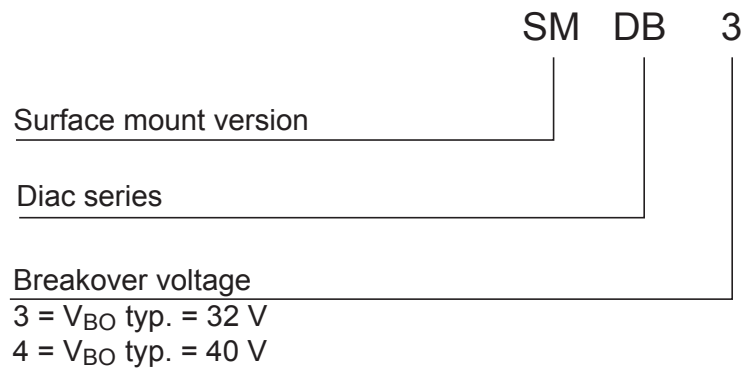


Table 4. DO-35 package mechanical data

| Ref. | Dimensions  |       |                             |       |
|------|-------------|-------|-----------------------------|-------|
|      | Millimeters |       | Inches (for reference only) |       |
|      | Min.        | Max.  | Min.                        | Max.  |
| A    | 3.05        | 4.50  | 0.120                       | 0.177 |
| B    | 1.53        | 2.00  | 0.060                       | 0.079 |
| C    | 28.00       | 31.00 | 1.102                       | 1.220 |
| D    | 0.46        | 0.55  | 0.018                       | 0.022 |



### 3 Ordering information

**Figure 10. Ordering information scheme**

**Table 5. Ordering information**

| Order code | Marking              | Package | Weight | Base qty. | Delivery mode |
|------------|----------------------|---------|--------|-----------|---------------|
| SMDB3      | DB3                  | SOT-23  | 0.01 g | 3000      | Tape and reel |
| DB3        | DB3 (Blue Body Coat) | DO-35   | 0.15 g | 5000      | Tape and reel |
| DB4        | DB4 (Blue Body Coat) |         | 0.15 g | 5000      | Tape and reel |

## Revision history

**Table 6. Document revision history**

| Date        | Version | Changes                                   |
|-------------|---------|---|
| 18-Jun-2018 | 2       | First release.                            |
| 14-Dec-2018 | 3       | Minor text change to improve readability. |

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